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or quality in this ordinance condemned or forbidden, he is empowered, authorized, and directed to immediately condemn the same and cause it to be destroyed properly, and to report his action to the health officer without delay.

18. That any person who shall violate any of the provisions of this ordinance shall be liable to a fine of not less than \$5 nor more than \$100 for each offense.

19. That the board of health is hereby authorized and empowered to prescribe reasonable rules and regulations particularly defining the duties of the dairy and food inspector, not inconsistent with the provisions of this ordinance; and said board is likewise authorized and empowered to prescribe reasonable rules and regulations for the management of stables or dairy farms where cows are kept, whether in or outside of the city, for the purpose of producing milk to be exposed to sale or sold within the city of Roanoke, not inconsistent with the provisions of this ordinance.

20. That police power is hereby conferred upon the health officer, the dairy and food inspector and the fumigator for the health department while in the discharge of their official duties, and that no person shall by threats or force attempt to intimidate or impede any of the said officers while in the discharge of their duty.

21. That sections 309, 310, and 311 of the general ordinances are hereby repealed.

22. This ordinance shall be in force from and after 30 days from its passage. [Ordinance approved Jan. 18, 1911.]

## CAMPAIGN AGAINST PLAGUE-INFECTED SQUIRRELS IN CALIFORNIA.

Plague appeared in California in 1900. The last case of that outbreak occurred February 29, 1904. From 1904 to May 23, 1907, no cases of plague, either human or rodent, were reported in California. On May 23, 1907, a case of human plague was found in the marine hospital in San Francisco. No further cases were reported until August 12, 1907, when the last outbreak began. From August, 1907, to January 30, 1908, the date of the last case, there occurred in San Francisco a total of 159 cases, with 77 deaths. Plague appeared September 12, 1907, in Oakland, where there were 12 cases and 7 deaths. The last case which was known to have been infected in Oakland occurred December 22, 1907. A subsequent case occurred on July 17, 1908, but the source of infection was not definitely known. It was believed to be due to ground squirrels. In addition to the cases above mentioned others have been found as follows:

Berkeley, 1; Point Richmond, 1; Contra Costa County, exclusive of Point Richmond, 2; Alameda County, exclusive of Oakland and Berkeley, 2; Los Angeles, 1; San Benito County, 1; Santa Clara County, 1. The 2 cases found in Contra Costa County, 2 in Alameda, 1 in Los Angeles, 1 in San Benito, and 1 in Santa Clara County, were believed to be due to infection from ground squirrels. The last human case reported occurred August 23, 1910, in Santa Clara County.

### SQUIRREL PLAGUE.

Since 1903 the presence of plague among the ground squirrels of California had been suspected and a number of experiments were made to determine whether they were susceptible to the disease. They were found to be highly susceptible. Many squirrels were then caught and examined, but none were found infected until August, 1908.

Two cases of human plague occurred in Contra Costa County in July, 1908. The history of the cases indicated that in all probability the infection had come from ground squirrels. Men were immediately detailed to the section in which the cases occurred with the result

that in a short time four infected squirrels were found. In order to learn the extent of the infection, hunters were sent to various parts of Contra Costa and Alameda Counties and large numbers of squirrels were collected and examined. A number were found to be infected and the work of extermination was begun.

In the latter part of April and early part of May, 1909, an organized campaign on a much larger scale was begun for the double purpose of exterminating squirrels and of learning to what further extent the infection had spread.

As a result of information obtained during the above-mentioned campaign and of information obtained at various times from the Biological Survey of the Department of Agriculture, the Secretary of the Treasury increased the allotment of \$14,000 per month available for the work to \$23,000 per month, and authorized the appointment from time to time of employees as needed.

The work is now being carried on under three heads, as follows:

(a) Destruction of known foci of infection.

(b) Determination of new and at present unknown foci of infection, to the end that the extent to which the infection has spread be made known as soon as possible.

(c) General squirrel eradication.

The work indicated under the heads *a* and *b* has been and is still going on under the direct control of this Service, and in addition a broad squirrel-free zone has been maintained around the cities of San Francisco, Oakland, Berkeley, and Alameda to prevent the possible reinfection of the rats of these cities through coming in contact with plague-infected squirrels in the outlying districts. That the maintenance of these squirrel-free zones is a valuable precaution is evidenced by the fact that no rat infection has been found in any of the cities thus protected since December 1, 1908. In this work around the cities much valuable information regarding the associations of rats and squirrels has been secured. Opportunity has been afforded for instructing new employees in the best methods of hunting, trapping, and poisoning, and in the maintenance of camps and their sanitation. Farmers and ranch owners and citizens have frequently visited these camps for the purpose of being instructed, and have on numerous occasions remained for several days, and it may be stated that much of the interest which the farmers and ranch owners of California are now taking in squirrel eradication is due to the instruction received and the observations made while visiting the squirrel-free zone and the camps therein situated.

With regard to the third heading (*c*. General squirrel eradication), a systematic examination of all the suspected counties of California has been inaugurated, beginning with the counties and localities on the border line of the State and working westward toward the coast. This work is still going on and is about completed, and arrangements have been made for the extermination of the squirrels in each of the counties where infection has been found. This will be done under the direct supervision of this Service and its officers, with the aid, however, of the State board of health, county supervisors, ranch owners, and farmers.

The general plan of operation is set forth at greater length in the annual report of the service for the fiscal year 1910; the plan as there described has since been carried out almost to completion, the

exception being the general squirrel eradication which has been going on wherever deemed most necessary and has been begun on the broadest scale therein indicated. With regard to the extent of the area known to be infected, it may be stated that plague infection has been found in either rats or squirrels in 12 counties, including the county of San Francisco, in which no infection has been demonstrated since October 23, 1908, and the county of Los Angeles, in which 1 human case and 1 infected squirrel constituted the total infection and where no infection of any kind has been found since August 21, 1908. Of the other 10 counties, in 8 the infection has been, as a rule, scattered and isolated. In 2 counties only, namely, Alameda and Contra Costa, has there been any extensive infection. It is in these 2 counties that most of the eradication work has been done, and that the infection has diminished greatly as the result of this work is evidenced by the fact that since July 1, 1910, only 26 plague-infected squirrels have been found in all of the counties where plague infection has at any time appeared.

The total cost to the Government of plague-suppressive measures in California has been as follows:

Fiscal year—	
1908.....	\$300, 904. 71
1909.....	275, 048. 06
1910.....	135, 391. 87
1911 (to and including Jan. 31).....	84, 298. 15
Total.....	795, 643. 15

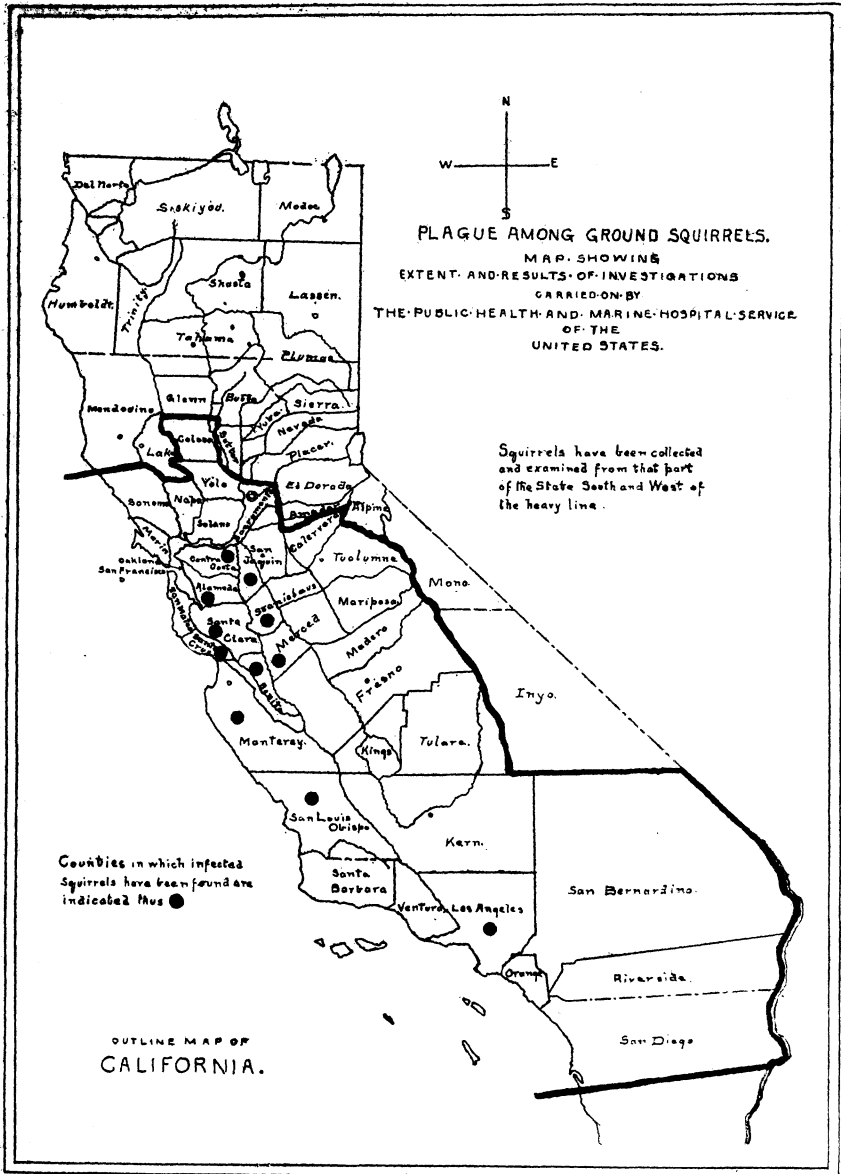
These sums include expenditures for suppressing the outbreak of human plague in San Francisco; the pay of detailed officers and employees; the continuous trapping and destruction of rats in San Francisco, Oakland, Berkeley, and other cities; the laboratory examination of rats captured; the inspection of insanitary conditions and supervision of sanitary measures in these cities; the fumigation of outgoing vessels, foreign and coastwise, in addition to the investigation of squirrel infection and squirrel eradication as indicated above. The sums also include expenditures that have been necessary for reconnaissance work in the States bordering on California, in order to determine whether plague infection had spread to these States. So far no evidence of any such spread of infection has been found. In addition to the above sum, the State of California, and the cities of San Francisco, Oakland, Berkeley, Alameda, Emeryville, Point Richmond, and Los Angeles, and the counties of Contra Costa, Alameda, San Mateo, and Los Angeles have during this period expended sums which can not be accurately determined, but which are believed to aggregate not less than \$500,000, and probably greatly exceed this amount.

The total number of rodents (rats, squirrels, etc.) collected and examined to ascertain the presence of infection from September, 1907, to March 4, 1911, was as follows:

Collected.....	992, 247
Examined for possible infection.....	729, 621
Found infected.....	937

Of the 937 rodents found infected, there were 524 rats (last infected rat found Dec. 1, 1908), 412 squirrels (last infected squirrel found Feb. 20, 1911), and 1 wood rat (found Oct. 17, 1909).

The last case of human plague occurred August 23, 1910.



The squirrels collected and examined from July 1, 1910, to March 4, 1911, were as follows:

Collected.....	85,647
Examined for possible infection.....	84,889
Found infected.....	26

The appended map indicates the counties from which squirrels have been collected and examined, involving an investigation of an area of approximately 80,000 square miles. The map also shows the counties within which infection has been found. The work has progressed so satisfactorily that there is now reason for believing that the area in which infection among ground squirrels is present will be definitely known within two or three months. Much squirrel eradication work is now being done by ranch owners and farmers under the direction of the service. They are actively at work in 10 counties, and the county authorities are aiding extensively by the appropriation of money and the appointment of inspectors. An officer of the service is traveling from county to county organizing the eradication work as he goes, and it is gratifying to know that he is receiving the heartiest assistance and cooperation from county authorities, farmers, landowners, and citizens generally.

Since the inauguration by the service of plague suppressive measures in San Francisco in 1907, much work has been done in the various cities and in the territory around San Francisco Bay of a more or less permanent nature.

Garbage collection and disposal systems have been materially improved, and much rat proofing by the use of concrete, galvanized iron, etc., has been carried out.

The sanitary inspection service of the cities has been materially improved, and this improvement has extended into all the various branches of municipal sanitation. Rat catching and poisoning are still going on and will be continued as long as plague suppressive measures are operative, for the purpose of exterminating rats in the cities and, through examinations of rats caught, for the additional purpose of learning whether plague infection has reappeared.

Vessels have been fumigated for the purpose of destroying rats and other vermin, and construction of rat-proof warehouses has been brought about, thus minimizing the danger of the spread of plague to other places.

As a result of the above-mentioned measures the following direct benefits to the community are apparent:

1. Diminution in number of cases and deaths due to preventable disease.
2. Diminution in flies.
3. Diminution in fleas.
4. Disappearance of plague in men and rats.
5. Improvement in building construction.

Indirectly the demonstration of the practical value of sanitation on a large scale has aroused a widespread interest, and the people generally are convinced that properly directed sanitary measures, in addition to benefiting the health of the community, pay in every way.